REMARKS

Claims 1 - 4 are pending in the application. Claims 1 – 4 have been amended. No new claims have been added. No new matter has been added by virtue of the amendments, support being found throughout the specification and from the claims as originally filed.

Applicants would like to thank Examiner Pak for the courtesy and time of his telephone interview of 25 May 2007. Applicants would like to also thank the Examiner for his consideration and thoughts on the application given during the teleconference.

Claim Rejections under 35 U.S.C. § 101

Claims 1 - 4 have been rejected under 35 U.S.C. § 101 for allegedly lacking "a credible, specific and substantial utility or a well established utility." (Office Action, p. 2). Applicants respectfully traverse the rejection.

The instant invention is directed to an isolated protein which is a cell surface protein having an ability to mediate the transport of an amino acid into a cell and having an ability to mediate the incorporation of at least one amino acid. The isolated protein can be an amino acid sequence represented by SEQ ID NO: 2 or SEQ ID NO: 4, or an amino acid sequence represented by SEQ ID NO: 2, wherein 1 to 20 amino acid residue(s) is (are) substituted, deleted or added or SEQ ID NO: 4, wherein 1 to 20 amino acid residue(s) is (are) substituted, deleted or added.

The Examiner maintains his reasons for rejection set as forth in the Office Action of 8/29/2005. The Examiner argues that "the specification as filed does not disclose or provide evidence that points to a property of the claimed transporter such that another non-asserted utility would be well established." (Office Action, p.2). The Examiner alleges that " (t)here is no nexus between the transporter claimed and the treatment of the diseases because the disorders are associated with other transporters which have different function from the currently claimed transporter." (Office Action, p.3). Applicants disagree.

Firstly, the threshold for utility is very low, and the court has held that "[t]he law . . . does not look to the degree of utility; it simply requires, that it shall be capable of use, and that the use is such as sound morals and policy do not discountenance or prohibit." (Bedford v. Hunt, 3 F. Cas. 37, 1 Robb, Pat. Cas. 148 (C.C.D. Mass. 1817)). Applicants have provided throughout the disclosure ample teaching that LAT1 has a role in disease, and accordingly that a LAT protein which is a cell surface protein having an ability to mediate the transport of an amino acid into a cell and having an ability to mediate the incorporation of at least one amino acid has utility. Applicants teach that expression of LAT1 is higher in tumor cells and in proliferating tissue, for example at page 8 – 9:

> As a result of a northern blotting using tumor cells derived from a human being and mRNA derived from human normal tissues, (LAT1) expression is noted as a band of about 4.8 kB in tumor cells derived from human being of a wide range including stomach signet ring cell carcinoma...malignant melanoma...and lung small cell carcinoma. In the human normal tissues, its expression is similarly confirmed as a band of about 4.8 kB only in specific and limited tissues where neogenesis and proliferation of cells are vigorous (placenta, liver of fetus, bone marrow, testicle, brain and peripheral leukocytes).

Applicants teach at page 9 of the disclosure that in a cell in which human LAT1 and human 4F2hc are co-expressed, there is increased incorporation of neutral amino acids. Applicants teach that amino acid transporters play an essential role in incorporation of amino acids necessary for generation, differentiation, proliferation and maintenance of all cells, and as such have been shown to be important in a number of different pathological conditions (see, e.g. page 9). For example, Example 9 shows expression of LAT1 gene in various tumor cell lines (p.105 – 106). Example 10 teaches that T24 cells derived from human bladder cancer can be used as an evaluation system for LAT1 inhibitors (p. 106). Example 12 teaches that inhibiting the incorporation of amino acids with a chemical inhibitor suppresses cell proliferation in cells with a highly functional LAT1 protein (p.109). Example 13 shows that in a mouse tumor model,

treatment with an amino acid transporter inhibitory compound resulted in inhibition of tumor growth (p.109 – 110). Given the teaching that LAT1 has a role in disease, a protein which is a cell surface protein having an ability to mediate the transport of an amino acid into a cell and having an ability to mediate the incorporation of at least one amino acid according to the instant claims has a specific, substantial and well-established utility.

Claims 1 - 4 have also been rejected under 35 USC 112, first paragraph, for allegedly failing to comply with the enablement requirement. The Examiner argues that "specifically, since the claimed invention is not supported by either a substantial asserted utility or a well established utility...one skilled in the art would not know how to use the claimed invention." (Office Action, p. 3). Applicants respectfully traverse the rejection.

Instant claims 1 - 4 are described above. Applicants have provided support for the claimed invention as having a substantial or well-established utility. Accordingly, one of skill in the art would know how to use the claimed invention.

Applicants respectfully request withdrawal of the rejection and allowance of the claims.

Claim Rejections under 35 U.S.C. § 112, first paragraph

Claims 1 - 4 have been rejected under 35 USC 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s) at the time the application was filed, had possession of the claimed invention." (Office Action, p. 4). Applicants respectfully traverse the rejection.

The Examiner argues that "claims 1 – 4 encompass a method of using variants. However, one skilled in the art cannot envision the full genus of molecules of the claimed polynucleotide molecules. (Office Action, p.4). The Examiner argues that "the claims encompass polynucleotide encoding variant proteins with different function from

species of LAT1 taught in the specification." (Office Action, p. 4). Applicants disagree, however in the interest of advancing prosecution, Applicants have amended the claims.

The instant claims recite an isolated protein which is a cell surface protein having an ability to mediate the transport of an amino acid into a cell and having an ability to mediate the incorporation of at least one amino acid. The isolated protein can be an amino acid sequence represented by SEQ ID NO: 2 or SEQ ID NO: 4, or an amino acid sequence represented by SEQ ID NO: 2, wherein **1 to 20** amino acid residue(s) is (are) substituted, deleted or added or SEQ ID NO: 4, wherein **1 to 20** amino acid residue(s) is (are) substituted, deleted or added.

Accordingly, the instant claims encompass a genus of LAT1 variants with 1 – 20 amino acid variations. Applicants have provided ample support in the specification for this genus of LAT1 variants, for instance through description of LAT1 structural properties (e.g. 12 transmembrane regions, p.9; phosphorylation sites, p.9; hydrophobic plot analysis, Figure 2, p.88).

Applicants respectfully request withdrawal of the rejection and allowance of the claims.

Claims 1 - 4 have been also rejected under 35 USC 112, first paragraph, for allegedly lacking enablement. The Examiner argues that the "specification does not reasonably provide enablement for a polypeptide variant, derivative or fragments." (Office Action, p.4). Applicants respectfully traverse the rejection.

The Examiner argues that the "claims encompass variants, derivatives and fragments with 1 – 40 amino acid changes to SEQ ID NO: 2 and 4. However, one skilled in the art cannot make and use variants, derivatives and fragments of SEQ ID NO: 2 and 4 with a generic function of transporting substantially same substance." (Office Action, p.6). The Examiner argues that "(t)he amount of direction provided in the specification is limited to a specific species of SEQ ID NO: 2 and 4." (Office Action, p. 6).

Applicants have amended the instant claims to recite an isolated protein, where the isolated protein can be an amino acid sequence represented by SEQ ID NO: 2 or

SEQ ID NO: 4, or an amino acid sequence represented by SEQ ID NO: 2, wherein **1 to 20** amino acid residue(s) is (are) substituted, deleted or added or SEQ ID NO: 4, wherein **1 to 20** amino acid residue(s) is (are) substituted, deleted or added. Accordingly, the instant claims are fully enabled.

Applicants respectfully request withdrawal of the rejection and allowance of the claims.

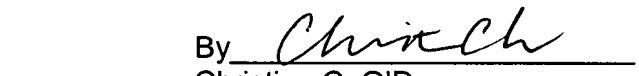
CONCLUSION

In view of the above amendment and remarks, Applicants believe the pending application is in condition for allowance.

Should the Examiner wish to discuss any of the amendments and/or remarks made herein, the undersigned attorney would appreciate the opportunity to do so.

Dated: September 4, 2007

Respectfully submitted,

By 

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